

What is claimed is:

1. A distal protection device disposable within a vessel of a body, comprising:
a filter basket positionable at a desired axial location within the vessel, said
filter basket having a closed distal end and an open proximal end;
and
a self-expanding radial member associated with said filter basket in
proximity to the proximal end thereof, said member being adapted to
maintain the proximal end of said filter basket in an opened
configuration.
2. The distal protection device of Claim 1, further comprising a guidewire
upon which said filter basket is mounted, wherein at least one end of said filter
basket is free-floating.
3. The distal protection device of Claim 2, wherein an opposite end of said
filter basket is fixedly attached to said guidewire.
4. The distal protection device of Claim 2, wherein said filter basket is in the
shape of a windsock, and said guidewire extends axially along said windsock.
5. The distal protection device of Claim 2, wherein said filter basket includes a
tube through which said guidewire extends.
6. The distal protection device of Claim 2, wherein said radial member
comprises a loop, and wherein said loop is generally circular in shape.

7. The distal protection device of Claim 3, wherein said filter basket is in the shape of a windsock, and said guidewire extends axially along said windsock.
8. The distal protection device of Claim 3, wherein said filter basket includes a tube through which said guidewire extends.
9. The distal protection device of Claim 3, wherein said radial member comprises a loop, and wherein said loop is generally circular in shape.
10. The distal protection device of Claim 1, wherein said radial member is formed in a "C" configuration.
11. The distal protection device of Claim 1, wherein said radial member is formed in a "J" configuration.
12. The distal protection device of Claim 1, wherein said radial member is formed in a spiral configuration.
13. The distal protection device of Claim 6, wherein said radial loop is made of nitinol wire.
14. The distal protection device of Claim 6, wherein said loop is radiopaque.
15. The distal protection device of Claim 6, wherein said loop is covered by a radiopaque material.
16. The distal protection device of Claim 6, wherein said loop, in its expanded state, generally defines a plane substantially perpendicular to said guidewire.

17. The distal protection device of Claim 6, wherein said loop, in its expanded state, is deployed at an angle of between 45 degrees and 90 degrees to said guidewire.

18. The distal protection device of Claim 6, wherein said filter basket and said loop are adapted to be collapsed to fit into a small diameter delivery catheter.

19. A method for capturing debris produced during a medical procedure in human vasculature, comprising the steps of:

inserting a catheter containing a distal protection device in a collapsed

configuration into human vasculature;

deploying the distal protection device on a distal side of the vasculature

affected by a medical procedure;

maintaining the distal protection device generally concentrically within the

vasculature; and

capturing debris produced by the medical procedure within the distal

protection device.

20. Apparatus to facilitate proper positioning of a medical instrument within a generally tubular vessel of the body along a guidewire fed into the vessel, comprising:

an element maintaining the medical instrument deployed laterally on a defined side of the guidewire; and

a collapsible, quasi-rigid spacer carried by the guidewire proximate a desired axial end of the medical instrument, and maintained, when expanded, deployed laterally on the defined side of the guidewire, said spacer having a dimension on the defined side of the guidewire sufficient to engage an inner surface of the vessel at a circumferential location and urge the guidewire against the inner surface of the vessel at a generally diametrically opposite location.

21. Apparatus in accordance with Claim 20 wherein said spacer has a proximal portion at the guidewire and a distal portion for engagement of the inner surface of the vessel, and wherein said distal portion is configured so as not to injure the inner surface of the vessel.

22. Apparatus in accordance with Claim 21 wherein said spacer comprises a wire form, and wherein said distal portion of said spacer comprises an arcuate portion of said wire form.

23. Apparatus in accordance with Claim 22 wherein said wire form defines a closed loop.

24. Apparatus in accordance with Claim 23 wherein said closed loop generally defines an angle of at least 45° relative to the guidewire.

25. Apparatus in accordance with Claim 22 wherein said wire form defines a generally C shape.

26. Apparatus in accordance with Claim 22 wherein said wire form defines a generally J shape.

27. Apparatus in accordance with Claim 21 wherein said spacer is radiopaque.

28. Apparatus to facilitate proper positioning of a medical instrument within a generally tubular vessel of the body along a guidewire fed into the vessel, comprising:

an element mounting the medical instrument to the guidewire at a defined axial position therealong; and

a collapsible, quasi-rigid spacer carried by the element, wherein said instrument is generally axially aligned with said spacer, said spacer having a dimension on one side of the guidewire sufficient so that it engages an inner surface of the vessel at a circumferential location thereon and urges the guidewire against the inner surface of the vessel at a generally diametrically opposite location.

29. Apparatus to facilitate proper positioning of a woven distal protection device within a generally tubular vessel of the body along a guidewire fed into the vessel, comprising:

an element mounting the distal protection device at a desired axial location along the guidewire; and

a collapsible, quasi-rigid spacer interwoven into a mouth of the distal protection device.

30. The distal protection device of Claim 4, wherein said guidewire extends axially within the windsock.

31. The distal protection device of Claim 2, wherein said filter basket includes a tube through which said guidewire extends, and wherein the end which is free-floating cooperates with said guidewire in a manner which allows the free-floating end to move axially along the guidewire until it engages an end of the tube.
32. A distal protection device disposable within a vessel of a body, comprising:
a filter basket positionable at a desired axial location within the vessel, said filter basket having a closed distal end and an open proximal end;
a guidewire upon which said filter basket is mounted; and
a generally radially self-expanding quasi-rigid member associated with said filter basket in proximity to the proximal end thereof, and wherein the filter basket and self-expanding member are each mounted on the guidewire and generally axially aligned with each other, said self-expanding member, in its expanded state, having a dimension on one side of the guidewire sufficient so that it engages an inner surface of the vessel at a circumferential location thereon and urges the guidewire toward the inner surface of the vessel at a generally diametrically opposite location.
33. The distal protection device of Claim 32 wherein at least one end of said filter basket is free-floating along said guidewire.
34. The distal protection device of Claim 33, wherein an opposite end of said filter basket is fixedly attached to said guidewire.
35. The distal protection device of Claim 33, wherein said filter basket is in the shape of a windsock and said guidewire extends axially along said windsock.
36. The distal protection device of Claim 35, wherein said guidewire extends axially within the windsock.

37. The distal protection device of Claim 33, wherein said filter basket includes a tube through which said guidewire extends, and wherein a proximate end of said filter basket cooperates with said guidewire in a manner which allows said proximate end to move axially on the guidewire until it engages an end of the tube.

38. The distal protection device of Claim 32, wherein said self-expanding member comprises a loop, and wherein said loop is generally circular in shape.

39. The distal protection device of Claim 32, wherein said self-expanding member is formed in a "C" configuration.

40. The distal protection device of Claim 32, wherein said self-expanding member is formed in a "J" configuration.

41. The distal protection device of Claim 32, wherein said self-expanding member is formed in a spiral configuration.

42. The distal protection device of Claim 32, wherein the self-expanding member is made of nitinol wire.

43. The distal protection device of Claim 32, wherein the self-expanding member is radiopaque.

44. The distal protection device of Claim 32, wherein the self-expanding member is covered by a radiopaque material.

45. The distal protection device of Claim 32, wherein the self-expanding member, in its expanded state, generally defines a plane substantially perpendicular to said guidewire.

46. The distal protection device of Claim 32, wherein said self-expanding member, in its expanded state, is deployed at an angle of between 45° and 90° to said guidewire.

47. The distal protection device of Claim 32, wherein said filter basket and said self-expanding member are adapted to be collapsed to fit into a small diameter delivery catheter.

48. A method for capturing debris produced during a medical procedure in a human vessel, comprising the steps of:

inserting a catheter containing a distal protection device in a collapsed configuration into the vessel, wherein the distal protection device comprises a filter basket positionable at a desired axial location within the vessel, a guidewire upon which said filter basket is mounted, and a generally radially self-expanding, quasi-rigid member associated with said filter basket in proximity to the proximal end thereof, and wherein the filter basket and self-expanding member are each mounted on the guidewire and generally axially aligned with each other, said self-expanding member, in its expanded state, having a dimension on one side of the guidewire sufficient so that it engages an inner surface of the vessel at a circumferential location thereon and urges the guidewire toward an inner surface of the vessel at a generally diametrically opposite location;

deploying the distal protection device on a side of the vessel distal with respect to an axial location affected by the medical procedure;

maintaining said distal protection device generally concentrically within the vessel; and

capturing debris produced by the medical procedure within the distal protection device.

49. A distal protection device disposable within a vessel of a body, comprising:
a filter basket positionable at a desired axial location within the vessel, said filter basket having a closed distal end and an open proximal end;
a guidewire upon which said filter basket is mounted; and
a self-expanding arcuate member that, when expanded, creates a radial force against a vessel wall to control the lateral position of the filter at a desired location in the blood vessel.
50. The device of Claim 49, wherein the self-expanding member is carried by the guidewire.
51. The device of Claim 50, wherein the self-expanding member resists lateral force of the guidewire to maintain the lateral position of the filter basket.
52. The device of Claim 50, wherein the self-expanding member exerts a radial force on the guidewire in proximity to the proximal end of the filter basket.
53. The device of Claim 49, wherein the self-expanding member is in proximity to the proximal end of the filter basket.
54. The device of Claim 50, wherein the self-expanding member, in its expanded state, is deployed at an angle of between 45° and 90° to said guidewire.
55. Apparatus in accordance with Claim 20 wherein said spacer has a distal portion at the guidewire and a proximal portion for engagement of the inner surface of the vessel, and wherein said proximal portion is configured so as not to injure the inner surface of the vessel.

56. The distal protection device of Claim 6, further comprising alignment maintenance means for precluding rotation of said loop relative to said proximal end of said filter basket.

57. The distal protection device of Claim 56 wherein said alignment maintenance means comprises at least one axially extending tether mating a point on said loop to a corresponding point at said proximal end of said filter basket.

58. The distal protection device of Claim 57 wherein said alignment maintenance means comprises a plurality of said tethers.

59. A method for capturing debris produced during a medical procedure in a human vessel, comprising the steps of:

- positioning a filter basket, having a closed distal end and an open proximal end, at a desired axial location within the vessel; and
- coupling a generally radially self-expanding member to the filter basket proximate the proximal end of the filter basket to maintain the proximal end of the filter basket in an opened configuration.

60. A distal protection device disposable within a vessel of a body, comprising:

- a filter basket positionable at a desired axial location within the vessel, said filter basket having a closed distal end and an open proximal end;

- a guidewire upon which said filter basket is mounted, said guidewire extending axially along said filter basket proximate a location on a periphery of a mouth defined by said open proximal end; and
- a self-expanding arcuate member that, when expanded, creates a radial force against a vessel wall to control the lateral position of the guidewire at a desired location in the blood vessel.

61. A method for capturing debris produced during a medical procedure in a human vessel, comprising the steps of:

providing a collapsible assembly including a filter basket positionable at a desired axial location within the vessel, the filter basket having a closed distal end and an open proximal end when the filter basket is deployed, and a generally radially self-expanding member disposed relative to the filter basket proximate the proximal end thereof, said member being adapted to maintain the proximal end of the filter basket in an opened configuration, when deployed;

inserting a catheter, confining said assembly in a collapsed configuration, into the human vessel; and

deploying the assembly from the catheter to allow said member to urge a mouth defined by the proximal end of the filter basket into engagement with an inner surface of the vessel.